

## PATENT COOPERATION TREATY



## PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY PCT  
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

REC'D 23 FEB 2005

WIPO  
PCT

Applicant's or agent's file reference 62620A	<b>FOR FURTHER ACTION</b> See Form PCT/PEA/416	
International application No. PCT/US2004/010837	International filing date (day/month/year) 08.04.2004	Priority date (day/month/year) 09.04.2003
International Patent Classification (IPC) or national classification and IPC C22C1/10, C23C16/22, C23C16/06, C22C49/04		
Applicant DOW GLOBAL TECHNOLOGIES INC. et al.		
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 6 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input type="checkbox"/> sent to the applicant and to the International Bureau) a total of sheets, as follows:</p> <p><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (Indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>		
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the opinion</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p>		
Date of submission of the demand 08.11.2004	Date of completion of this report 22.02.2005	
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Brown, A Telephone No. +49 89 2399-2563 	

**INTERNATIONAL PRELIMINARY REPORT  
ON PATENTABILITY**

International application No.  
PCT/US2004/010837

**Box No. I Basis of the report**

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
  - ☐ publication of the international application (under Rule 12.4)
  - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements\*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

**Description, Pages**

1-9 as originally filed

**Claims, Numbers**

1-20 as originally filed

**Drawings, Sheets**

1/1 as originally filed

- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages
  - ☐ the claims, Nos.
  - ☐ the drawings, sheets/figs
  - ☐ the sequence listing (*specify*):
  - ☐ any table(s) related to sequence listing (*specify*):
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages
  - ☐ the claims, Nos.
  - ☐ the drawings, sheets/figs
  - ☐ the sequence listing (*specify*):
  - ☐ any table(s) related to sequence listing (*specify*):

\* If item 4 applies, some or all of these sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT  
ON PATENTABILITY**

International application No.  
PCT/US2004/010837

---

**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

---

**1. Statement**

Novelty (N)	Yes: Claims	4-7, 11-14, 16, 18
	No: Claims	1-3, 8-10, 15, 17, 19-20
Inventive step (IS)	Yes: Claims	
	No: Claims	1-20
Industrial applicability (IA)	Yes: Claims	1-20
	No: Claims	

**2. Citations and explanations (Rule 70.7):**

**see separate sheet**

**Re Item V.**

**1. The Prior Art**

D1: JP58144441

D2: Low Temperature Processing of B<sub>4</sub>C-Al Composites Via Infiltration Technique - Lee and Kang, Materials Chemistry and Physics, 67, (2001) 249-255.

D3: US4559246

D4: US5399378

D5: EP1245314 A2

D6: US3753694

**2. Clarity (Article 6 PCT)**

The subject matter of claims 1 and 2 do not satisfy the requirements of Article 6 PCT for the following reasons. There is no support within the description that supports the claim that any metal will achieve the aims of the invention and therefore the broad scope of claim 1 and its dependent claim 2 should be amended to reflect the scope afforded by the description. Furthermore the use of the phrase "chemically stable" is objected to under Article 6 as it is ambiguous due to the fact that it has no well defined meaning and therefore leads to difficulty in assessing exactly what compounds would achieve the aims of the invention. The applicant is requested to list exactly which compounds are known to him that have been used satisfactorily in order to achieve the invention.

**4. Claims 1-14 - A Composition**

D1-D6 relate to metal matrix composites and discloses the following features:

**D1**

Carbon fibres coated in titanium nitride by chemical vapour deposition that are within a metal matrix (Al,Mg,Cu) (see Abstract).

**D2**

concerns aluminium matrix composites and discloses the formation of a  $\text{TiB}_2$  coating onto  $\text{B}_4\text{C}$  reinforcing fibres used in the production of a porous preform (see Abstract and introduction on pages 249-250).

**D3**

D3 concerns magnesium matrix composites that contain graphite fibres that have been coated with oxides of either Cr, Mo, Fe or Ni to improve the wettability of the fibres (see col 1, l. 50-58, col 2, l.2-3).

**D4**

D4 concerns the manufacture of carbon fibres for improved chemical stability. Disclosed is the formation of a ceramic layer on the fibre surface which may be  $\text{SiC}$ ,  $\text{ZrC}$ ,  $\text{TiC}$ ,  $\text{HfC}$ ,  $\text{B}_4\text{C}$ ,  $\text{NbC}$  or  $\text{WC}$  (see col 2, l.5-19). The ceramic layers are produced by chemical vapour deposition of the appropriate gases and a final heat treatment is performed on the coated fibres in an inert gas atmosphere at a temperature of 1000-3000°C.

**D5**

D5 concerns the production of metal matrix composite materials that have a matrix made from metals such as Al, Ti, Ni, Nb etc or one of a number of intermetallic compounds (see paragraph 0003). The disclosed reinforcement materials are  $\text{Al}_2\text{O}_3$ ,  $\text{SiC}$ ,  $\text{AlN}$  or  $\text{Si}_3\text{N}_4$  which may be in the form of fibres, particles whiskers etc (see paragraph 0018). The use of a metallic coating of either Ni, Ti or Nb (see paragraphs 0013, 0014, 0015 and 0021) that is applied to the reinforcement surface using any technique such as electroless plating, chemical vapour deposition, physical vapour deposition or sputtering etc is disclosed (see paragraph 0016). This metallic coating is applied in order to improve the wettability of the reinforcement with the matrix material (see paragraph 0039).

**D6**

D6 discloses the use of a metallic coating such as Ni, Cu, Co, Fe, Zn etc that is applied to graphite powder for use as a reinforcement material in an Al matrix in order to improve the wettability characteristics of the graphite (see col 1, l. 31-38, col 2, l. 22-39).

In view of the above disclosures, the subject matter of claim 1 lacks novelty with respect to D1-D6.

None of the dependent claims 2-7 appear to contain anything that could form the basis of a new and inventive main claim. In particular the features of claim 2 are known from D5 and D6 and those of claim 3 are known from D3. Claim 4 would not appear to be inventive in view of the disclosures in D3 in combination with the teaching of either D5 or D6 and those of claims 5 and 6 lack inventive step in view of the combined teaching of D2 and D3. The subject matter of claim 7 would appear to be derivable from the combination of D2 and D5.

The additional features of claim 8, namely a porous preform are anticipated by D1-D6, those of claim 9 are anticipated by D5 and D6 and the subject matter of claim 10 lacks novelty with respect to D3. The subject matter of claims 11, 13 and 14 would appear to lack an inventive step in consideration of the disclosures of D3 taken in conjunction with the teaching of D5, and those of claim 12 are derivable from the combination of D2 and D3.

## **2.1 Claims 15-20 - A Process for Coating a Ceramic Filler with a ceramic Material**

The process as described in claims 15-20 describes the vapour deposition of ceramic coatings onto reinforcement materials. This process is a standard means of applying both ceramic and metallic coatings to ceramic materials (see D1 and D4) and therefore contains nothing that could be considered novel and inventive over the prior art. In particular claims 15 and 19 and 20 are known from D1 and D2 and those of 17 are known from D4. The subject matter of claim 16 is rendered obvious by the combined teaching of D1 and D3 and that of claim 18 by the teaching of D1 and D2.